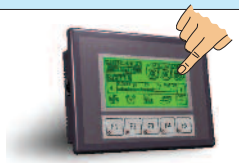
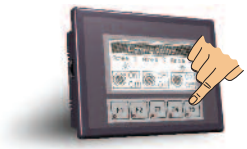
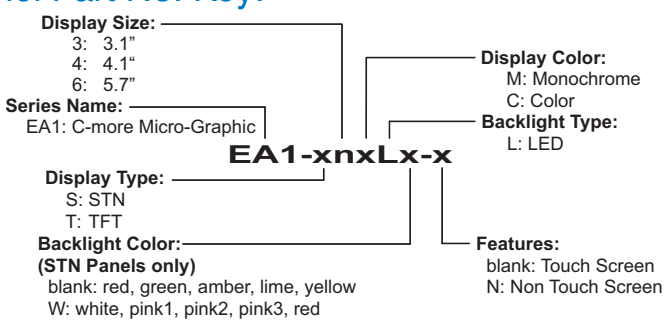
C-more Micro-Graphic Panels Selection Guide

C-more Micro-Graphic Panels			
Part Number		**Description**	**Price**
EA1-S3ML		3.1-inch ***C-more*** Micro-Graphic Touch Panel with green and red LED backlights. Supports 5 selectable backlight colors (Green, Red, Amber, Yellow and Lime). STN LCD monochrome, 128 x 64 dot display. Has 5 user-defined function keys with LED indicators. Power is supplied to the panel through the serial communication port connection when used with ***Direct***LOGIC PLCs having an RJ12 communication port. EA-MG-SP1 (power supply with serial option module) required when connecting to third party PLCs. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S3ML-N	**Non-Touch**	3.1-inch ***C-more*** Micro-Graphic Non-Touch Panel with green and red LED backlights. Supports 5 selectable backlight colors (Green, Red, Amber, Yellow and Lime). STN LCD monochrome, 128 x 64 dot display. Has 5 user-defined function keys with LED indicators. Power is supplied to the panel through the serial communication port connection when used with ***Direct***LOGIC PLCs having an RJ12 communication port. EA-MG-SP1 (power supply with serial option module) required when connecting to third party PLCs. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S3MLW		3.1-inch ***C-more*** Micro-Graphic Touch Panel with High Contrast white and red LED backlights. Supports 5 selectable backlight colors (White, Pink1, Pink2, Pink3 and Red). STN LCD monochrome, 128 x 64 dot display. Has 5 user-defined function keys with LED indicators. Power is supplied to the panel through the serial communication port connection when used with ***Direct***LOGIC PLCs having an RJ12 communication port. EA-MG-SP1 (power supply with serial option module) required when connecting to third party PLCs. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S3MLW-N	**Non-Touch**	3.1-inch ***C-more*** Micro-Graphic Non-Touch Panel with High Contrast white and red LED backlights. Supports 5 selectable backlight colors (White, Pink1, Pink2, Pink3 and Red). STN LCD monochrome, 128 x 64 dot display. Has 5 user-defined function keys with LED indicators. Power is supplied to the panel through the serial communication port connection when used with ***Direct***LOGIC PLCs having an RJ12 communication port. EA-MG-SP1 (power supply with serial option module) required when connecting to third party PLCs. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-T4CL		4-inch ***C-more*** Micro-Graphic Touch Panel with TFT Color LCD, 320 x 240 dot, 32,768 color display with LED backlight. 5 user-defined function keys with LED indicators. Two built-in ports (USB Type-B port and 15-pin D-sub RS-232/422/485 port). Display supports Portrait and Landscape modes. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S6ML		5.7-inch ***C-more*** Micro-Graphic Touch Panel with STN LCD monochrome, 320x240 dot display. The panel has red and green LED backlights. Supports 5 selectable backlight colors (Red, Green, Amber, Lime, and Yellow). Includes 5 user-defined function keys with LED indicators. 2 built in serial Ports (RS-232 RJ12 port and 15 pin D-sub RS-232/422/485). NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S6MLW		5.7-inch ***C-more*** Micro-Graphic Touch Panel with STN LCD monochrome, 320x240 dot display. The panel has white and red LED backlights. Supports 5 selectable backlight colors (White, Pink1, Pink2, Pink3, and Red). Includes 5 user-defined function keys with LED indicators. 2 built in serial Ports (RS-232 RJ12 port and 15 pin D-sub RS-232/422/485). NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-T6CL		5.7-inch ***C-more*** Micro-Graphic Touch Panel with TFT Color LCD, 320 x 240 dot, 32,768 color display with LED backlight. 5 user-defined function keys with LED indicators. Two built-in ports (USB Type-B port and 15-pin D-sub RS-232/422/485 port). Display supports Portrait and Landscape modes. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->

C-more Micro-Graphic Panel Part No. Key:



C-more Micro-Graphic Panels Selection Guide

C-more Micro-Graphic Panel Accessories			
Part Number		**Description**	**Price**
EA-MG-BZ1		8-button keypad bezel for *C-more* 3" Micro-Graphic panels, with 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-MG-BZ2		20-button keypad bezel with numeric keypad for *C-more* 3" Micro-Graphic panels, with 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad to enter numeric data. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-MG-P1		Optional DC Power Adapter for *C-more* 3" Micro-Graphic panels. Required when using third party PLCs, or when using 24 VDC power instead of the 5 VDC supplied from the RJ12 connector of a Productivity Series, CLICK or *Direct*LOGIC PLC.	<--->
EA-MG-SP1		Optional Serial Port with DC Power Adapter for *C-more* 3" Micro-Graphic panels. Serial port is a D-Sub 15-pin RS-232/RS-422/485 connector. Required when using RS422, RS485 or third party PLCs.	<--->
EA-MG-COV-CL		Optional clear screen overlay used to protect *C-more* 3" Micro-Graphic displays from minor scratches and wear. Package contains 5 clear screen overlays.	<--->
EA-4-COV2		Optional clear screen overlay used to protect *C-more* 4" Micro-Graphic displays from minor scratches and wear. Package contains 3 clear screen overlays.	<--->
EA-MG6-BZ2		For Landscape (Horizontal) Mounted Panels. 20-button keypad bezel with numeric keypad for *C-more* 6" Micro-Graphic panels, 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad to enter numeric data. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-MG6-BZ2P		For Portrait (Vertical) Mounted Panels. 21-button keypad bezel with numeric keypad for *C-more* 6" Micro-Graphic panels, 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and (2) ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad to enter numeric data. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-6-COV2		Optional clear screen overlay used to protect *C-more* 6" Micro-Graphic displays from minor scratches and wear. Package contains 3 clear screen overlays.	<--->

C-more 6" Micro-Graphic TFT Touch Panel

Model EA1-T6CL *C-more* 6" Micro-Graphic touch panel has a 5.7-inch TFT LCD 320 x 240 dot display and a palette of 32K colors for customizing objects, screen backgrounds and displaying bitmap graphics. It features five user-defined function keys, each key with a user-defined red LED indicator. The panel can display up to 40 lines by 80 characters of static text and up to 40 lines by 40 characters of dynamic text with embedded variables and phrases mixed with graphics in landscape orientation. Portrait orientation can display 53 lines by 60 characters of static text and 40 lines by 40 characters of dynamic text. It is rated UL for use on a flat surface of Type 1, 4X enclosure (for indoor use only). The *C-more* 6" Micro-Graphic TFT panels are powered from a Class 2, 12-24 VDC power supply*.

Part No. EA1-T6CL

Shown in Landscape (Horizontal) mode

<---->

Features

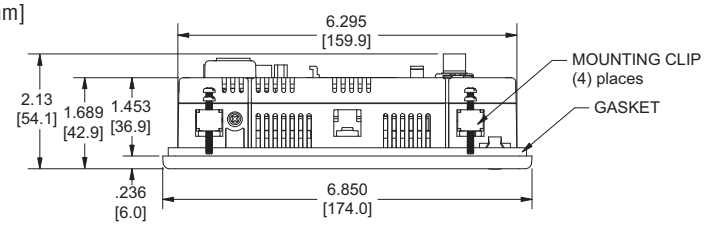
- Touch screen display
- Free downloadable programming software
- 320 x 20 Dot display with up to 40 lines by 80 characters of text and graphics in landscape mode
- Up to 40 lines by 40 characters of dynamic text with embedded variables and phrases mixed with graphics
- 5 programmable function keys can change with every screen. Can increment / decrement values, trigger recipes, view index of screens.
- 32K colors
- 2 optional keypad bezels, 20-button landscape and 21-button portrait
- Optional replaceable clear screen overlay
- 3,276 KB memory
- Built-in USB type B programming port
- Built-in 15-pin serial communications port
- Built-in Alarm Control setup that activates beep, backlight flash, customized alarm banner, and red LED blinking
- 0 to 50 °C (32 to 122 °F) operating temperature range (IEC 60068-2-14)
- NEMA 4/4X, IP65 compliant when mounted correctly, indoor use only
- UL, cUL & CE agency approvals
- 2-year warranty from date of purchase

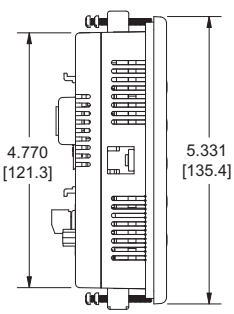
NOTE: Don't forget the optional keypad bezels shown in the Accessories section.

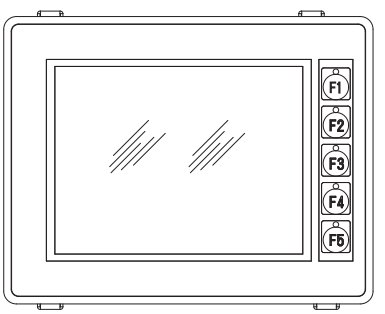
***NOTE: The EA1-T6CL can be powered through Port1 when connected to a PC for programming, the screen brightness is diminished because the panel is running in Low-Power Mode. For full brightness, connect an external Class 2, 12-24 VDC power source to the 6" panel's power connection. An external Class 2, 12-24 VDC power source must be used when the panel is installed in its application.**

Dimensions

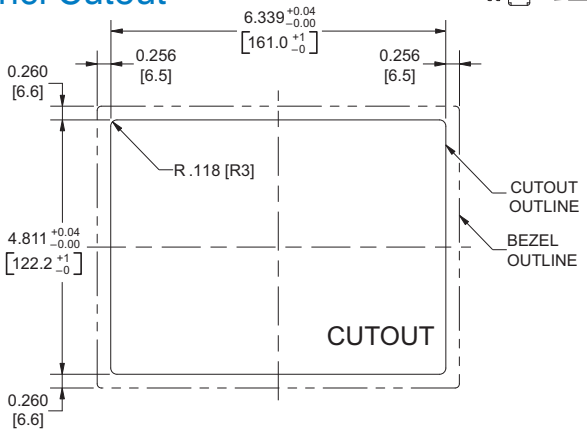
Units: inches [mm]



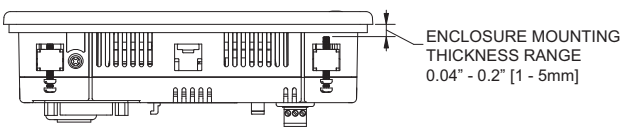




Panel Cutout



Panel Thickness



NOTE: The *C-more* 6" Micro-Graphic cutout dimensions are not equivalent to previous *AutomationDirect* text panels. The *C-more* 6" Micro-Graphic panels will not fit in cutouts for DV-1000, EZText, Optimate panels or C-more 6" panels.

C-more 6" Micro-Graphic Panels Overview

Overview

C-more 6" Micro-Graphic panels are joined by a full color, TFT model! *C-more* 6" Micro-Graphic panels offer touch screen capability and customizable graphics. Two optional Keypad Bezels are available for either Horizontal or Vertical panel orientation.

In addition to the simple panel configuration software, a very helpful feature is the built-in project simulator. The project simulator allows you to view your project on the PC screen as it would appear on the panel and to test all your screens before downloading the project to the panel. You can simulate your entire project at any stage of development. With version 2.50 or later, simulate the function keys and keypad bezel.

Getting started

Installing the software and configuring the *C-more* 6" Micro-Graphic panel is simple. You will need the following to successfully connect and configure a project for the panel:

- ***C-more*** 6" Micro-Graphic panel
- ***C-more*** Micro-Graphic Programming Software EA-MG-PGMSW (Downloadable version available from the ***AutomationDirect*** web site at no charge.)
- ***C-more*** Micro-Graphic USB Programming Cable such as USB-CBL-AB6, used to connect between a PC and the Micro-Graphic panel's built-in serial port. The panel will operate in Low-Power mode when powered by the PC and the screen brightness is diminished.
- Power source – An external Class 2, 12-24 VDC power source is required for normal High-Power operation. Recommended power supplies are AutomationDirect part numbers PSC-24-015 or PSC-24-030.
- Personal computer – to run the ***C-more*** Micro-Graphic programming software
- Communications Cable (serial) – to connect the ***C-more*** Micro-Graphic panel to your controller.

Drivers for your Controller

C-more 6" Micro-Graphic panels have the following drivers available for connection to Productivity Series, CLICK, *Direct*LOGIC and many other devices:

- AutomationDirect Productivity Series
- AutomationDirect Do-more
- AutomationDirect CLICK (Modbus)
- ***Direct***LOGIC K-sequence, *Direct*LOGIC *Direct*NET, ***Direct***LOGIC Modbus (Koyo Addressing)
- Modbus RTU
- Allen Bradley DF1 Full Duplex, Allen Bradley DF1 Half Duplex, Allen Bradley PLC5 DF1, AB DH485
- Omron Host Link (C200 Adapter, C500) Omron FINS serial (CJ1, CS1)
- GE SNPX (90/30, 90/70, Micro 90, VersaMax Micro)
- Mitsubishi Melsec FX
- Siemens PPI
- Entivity Modbus RTU
- AutomationDirect GS Drives
- AutomationDirect SOLO Temperature Controllers
- Mitsubishi Q/QnA

EA1-S6ML

<--->

Shown in Landscape (Horizontal) mode

EA1-S6MLW

<--->

Shown in Portrait (Vertical) mode

EA1-T6CL

<--->

Shown in Portrait (Vertical) mode

NOTE: EA1-T6CL requires Software and Firmware Version 2.50 or later. Software and Firmware Version 2.0 or later is required with models EA1-S6ML and EA1-S6MLW.
Available for free download at *www.automationdirect.com.*

Features

Bitmaps

- 320 X 240 pixel graphical display supports bitmaps
- Use bitmap images of pushbuttons, switches, indicators, your company logo
- Use provided library of bitmaps
- Create your own library of bitmaps

Text - 40 lines

- 40 lines by 80 characters of static text in Landscape Orientation
- 53 lines by 60 characters of static text in Portrait Orientation
- Look up text, scroll up to 128 characters
- 40 lines by 40 characters of dynamic text, embedded variables, on/off phrases, scroll up to 40 characters
- Scroll text object with up to 128 characters

Beep

- Beep to indicate an alarm
- Beep for a special message
- Beep to verify when button is pressed

Bar graphs

- Line, vertical, horizontal, skinny, fat, multiple

Data entry

- Pop-up numeric key pad on the screen
- Increment/decrement a value by touching arrows
- Two optional keypad bezels, Landscape and Portrait

Recipes

Each recipe button transfers up to 99 values from PLC source registers to PLC destination registers and/or from the recipe table to PLC destination registers.

5 dynamic background colors - EA1-S6ML and EA1-S6MLW

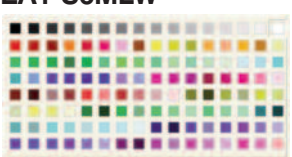
Screen background can be controlled by the program to choose one of five colors depending upon the model. Choices for model EA1-S6ML are green, lime, yellow, amber and red. Model EA1-S6MLW background colors include white, pink1, pink2, pink3 and red . For example, use a red background for an alarm condition or a yellow background on a caution screen that will be easily noticed.

EA1-S6ML

EA1-S6MLW

32K Colors - EA1-T6CL

The TFT panel has a palette of 32K colors available to make full use of color for objects and bitmaps as well as backgrounds.



Up to 999 Screens

C-more Micro-Graphic supports up to 999 screens. Screen quantity is limited by memory usage which is determined by the total bitmaps, objects, etc. that are used.

C-more 6” Micro-Graphic Panels Overview

C-more 6” STN Micro-Graphic Panels			
Part Number		***Description***	***Price***
EA1-S6ML		5.7-inch ***C-more*** Micro-Graphic Touch Panel with STN LCD monochrome, 320x240 dot display. The panel has red and green LED backlights. Supports 5 selectable backlight colors (Red, Green, Amber, Lime, and Yellow). Includes 5 user-defined function keys with LED indicators. 2 built in serial Ports (RS-232 RJ12 port and 15 pin D-sub RS-232/422/485). NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA1-S6MLW		5.7-inch ***C-more*** Micro-Graphic Touch Panel with STN LCD monochrome, 320x240 dot display. The panel has white and red LED backlights. Supports 5 selectable backlight colors (White, Pink1, Pink2, Pink3, and Red). Includes 5 user-defined function keys with LED indicators. 2 built in serial Ports (RS-232 RJ12 port and 15 pin D-sub RS-232/422/485). NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
EA-MG-PGM-CBL		The STN monochrome panels require the USB to serial assembly to connect a personal computer to the panel for programming. (Note: This cable assembly uses the PC's USB port and converts the signals to serial transmissions. The USB port supplies 5 VDC to the Micro-Graphic panel for configuration operations). Assembly includes standard USB A-type connector to B-type connector cable, custom converter, and an RS232C cable with RJ12 modular connector on each end.	<--->

***NOTE: *C-more* Micro-Graphic panels with the letter “W” in the part number designate units with 5 selectable background colors of White, Pink1, Pink2, Pink3 and Red. Part numbers without the letter “W” are provided with 5 selectable background colors of Green, Red, Amber, Yellow and Lime.**

Note: Software and Firmware Version 2.0 or later is required with models EA1-S6ML and EA1-S6MLW. Available for free download at *www.automationdirect.com.*

C-more 6” TFT Micro-Graphic Panel			
Part Number		***Description***	***Price***
EA1-T6CL		5.7-inch C-more Micro-Graphic Touch Panel with TFT Color LCD, 320 x 240 dot, 32,768 color display with LED backlight. 5 user-defined function keys with LED indicators. Two built-in ports (USB Type-B port and 15-pin D-sub RS-232/422/485 port). Display supports Portrait and Landscape modes. NEMA 4/4X, IP65 (when mounted correctly; for indoor use only).	<--->
USB-CBL-AB3		The C-more Micro-Graphic TFT panel requires a USB A-to-B type cable to connect a personal computer to the panel for programming. (Note: The TFT panel includes a built-in USB to serial converter and the USB driver will appear as a COM port to the PC when properly installed. The USB port supplies 5VDC to the TFT panel so that no external power supply is required for programming.)	<--->
USB-CBL-AB6			<--->
USB-CBL-AB10			<--->
USB-CBL-AB15			<--->

Note: Software and Firmware Version 2.5 or later is required with model EA1-T6CL. Available for free download at *www.automationdirect.com.*

C-more 6" Micro-Graphic Panels Overview

C-more Micro-Graphic Programming Software			
Part Number		**Description**	**Price**
EA-MG-PGMSW		***C-more*** Micro-Graphic panel Windows-based configuration software. Requires Windows 2000 with Service Pack 4, XP Home or Professional 32-bit with Service Pack 2, Vista, Windows 7 32-bit or 64-bit or Windows 8 32-bit or 64 bit. Requires USB port connection from PC to touch panel. Includes CD-ROM. Programming cable sold separately. Downloadable version available from the Web site at no charge. Software Help Files included in download. Programs all C-more Micro-Graphic Panels	<--->

C-more 6" Micro-Graphic Panel Accessories			
Part Number		**Description**	**Price**
EA-MG6-BZ2		For Landscape (Horizontal) Mounted Panels. 20-button keypad bezel with numeric keypad for ***C-more*** 6" Micro-Graphic panels, 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad to enter numeric data. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-MG6-BZ2P		For Portrait (Vertical) Mounted Panels. 21-button keypad bezel with numeric keypad for ***C-more*** 6" Micro-Graphic panels, 4 arrow adjust keys, and ESCAPE, MENU, CLEAR and (2) ENTER buttons. Helps to reduce screen wear in heavy-duty applications where operators can use the keypad to enter numeric data. Designed for easy drop-in of the Micro-Graphic panels.	<--->
EA-6-COV2		Optional clear screen overlay used to protect ***C-more*** 6" Micro-Graphic displays from minor scratches and wear. Package contains 3 clear screen overlays.	<--->

For a list of supported protocols and cabling options refer to the 4" & 6" *C-more* Micro-Graphic Protocols and cabling chart starting on page 11-61.

C-more 6" Micro-Graphic Specifications

Specifications			
	EA1-S6ML	**EA1-S6MLW**	**EA1-T6CL**
Description	320 x 240 dots LCD display (Landscape Mode), five user defined keypad function buttons, and five user defined LED's		
Display			
• Type	5.7" STN monochrome LCD, graphical characters		5.7" TFT Color LCD, graphical characters
• Resolution	320 (W) x 240 (H) dots (Landscape Mode) 240 (W) x 320 (H) dots (Portrait Mode)		
• Color	2 colors (normal / inverse)		32768 colors
• Viewing Area Size	4.614" (W) x 3.480" (H) [117.2 mm x 88.4 mm]		4.574" (W) x 3.483" (H) [116.2 mm x 87.4 mm]
• Active Area Size	4.535" (W) x 3.400" (H) [115.2 mm x 86.4 mm]		
• Contrast	Adjusted from the panel's built-in configuration setup menu		
• Viewing Angle	3, 9 o'clock axis –> 45 degrees 6 o'clock axis –> 40 degrees 12 o'clock axis –> 20 degrees		3, 9 o'clock axis –> 50 degrees 6 o'clock axis –> 50 degrees 12 o'clock axis –> 45 degrees
Backlight			
• Type	LED		
• Color	5 user defined colors: **EA1-S6ML -** Red, Green, Amber, Lime, and Yellow **EA1-S6MLW -** White, Pink1, Pink2, Pink3 and Red		White
• User Replaceable	No		
Touch Screen			
•Type	Analog touch panel		
• Operation	82 gram force [0.8 N] maximum		
• Life	Minimum of 1,000,000 cycles		
Features			
• User Memory	1792 kBytes		3276 kBytes
• Number of Screens	Up to 999 – limited by project memory usage		
• Beep (Internal)	Yes		
• Keypad Function Buttons	Five user defined function key buttons with the ability to customize label with an overlay. Minimum of 500,000 cycles		
• Keypad Function Button LEDs	Each function key button includes a red LED that can be user programmed.		
• Programming Port	RJ12		USB Type B
• Serial Communications	Built-in RJ12 serial communications port (RS-232) and 15-pin D-sub serial communications port (RS-232, RS-485 / 422).		15-pin D-sub serial communications port (RS-232, RS-485 / 422)
• Expansion Connection	Yes – used with optional Keypad Bezels, EA-MG6-BZ2 & EA-MG6-BZ2P		
Screen Objects			
• Functional Devices	Push Button, Switch, Indicator Button, Indicator Light, Graphic Indicator Light, Numeric Display, Numeric Entry, Inc/Dec Value, Bar Graph, Bitmap Button, Static Bitmap, Dynamic Bitmap, Recipe Button, Static Text, Lookup Text, Dynamic Text, Screen Change Push Button, Screen Selector, Adjust Contrast, Function, Key Configuration Object, Real Time Graphics Line Graph, Analog Meter.		
• Static Shapes	Lines, Rectangles, Circles and Frames		
• Displayable Fonts	Fixed fonts: 4x6, 6x6, 6x6B, 6x8, 8x16, 8x32, 8x64, 16x16, 16x32, 16x64, 32x16, 32x32, 32x64, and Windows fonts		
Physical			
• Dimensions	6.850" (W) x 5.331" (H) x 2.130" (D) [174.0 mm x 135.4 mm x 54.1 mm] (Landscape Mode) 5.331" (W) x 6.850" (H) x 2.130" (D) [135.4 mm x 174.0 mm x 54.1 mm] (Portrait Mode)		
• Enclosure Mounting Thickness Range	0.04" – 0.2" [1 – 5 mm]		
• Mounting Clip Screw Torque Range	21 – 28 oz-in [0.15 – 0.2 Nm]		
• Depth from bezel rear with options Module	1.894" [47.1 mm]		
• Weight	30.69 oz (870g)		

***C-more* 6" Micro-Graphic panel specifications continued on next page.**

C-more 6” Micro-Graphic Specifications

Specifications			
	EA1-S6ML	***EA1-S6MLW***	***EA1-T6CL***
Physical			
• Dimensions	6.850” (W) x 5.331” (H) x 2.130” (D) [174.0 mm x 135.4 mm x 54.1 mm] (Landscape Mode) 5.331” (W) x 6.850” (H) x 2.130” (D) [135.4 mm x 174.0 mm x 54.1 mm] (Portrait Mode)		
• Enclosure Mounting Thickness Range	0.04” – 0.2” [1 – 5 mm]		
• Mounting Clip Screw Torque Range	21 – 28 oz-in [0.15 – 0.2 Nm]		
• Depth from bezel rear with options Module	1.894” [47.1 mm]		
• Weight	30.69 oz. (870 g)		
Environmental			
• Operating Temperature	0 to 50 °C (32 to 122 °F) Maximum surrounding air temperature rating: 50 °C		
• Storage Temperature	–20 to +60 °C (–4 to +140 °F)		
• Humidity	5–95% RH (non-condensing)		
• Environmental Air	For use in Pollution Degree 2 environment		
• Vibration	IEC60068-2-6 (Test Fc), 5-9 Hz: 3.5 mm amplitude, 9-150 Hz: 1.0G, sweeping, at a rate of 1 octave/min. (±10%), 10 sweep cycles per axis on each of 3 mutually perpendicular axes		
• Shock	IEC60068-2-27 (Test Ea), 15 G peak, 11 ms duration, three shocks in each direction per axis, on 3 mutually perpendicular axes (total of 18 shocks)		
• Noise Immunity	NEMA ICS3-304 RFI, (145 MHz, 440 Mhz 10 W @ 10 cm) Impulse 1000 V @ 1 µs pulse		
• Enclosure	For use on a flat surface of Type 1, 4X enclosure (Indoor use only)		
• Agency Approvals	CE (EN61131-2), UL508, CUL Canadian C22.2 No. 142-M95, UL File E157382, CSA 234884		
***C-more* 6” Micro-Graphic panel specifications continued on next page.**			

NOTE: The environmental specifications for the panels shown above are also applicable for the *C-more* 6” Micro-Graphic accessories shown later in this section of the catalog.

C-more 6” Micro-Graphic Specifications

Specifications		
EA1-S6ML and EA1-S6MLW		
Electrical		
	Low Power Mode*	**High Power Mode**
• Input Voltage Range	5.0 VDC (4.75 – 5.25 VDC)	12/24 VDC (10.2 – 26.4 VDC)
• Input Power	Supplied through the panel’s RJ12 serial communications port connection when used with most AutomationDirect PLCs having a RJ12 communication port or from a PC USB.	Supplied from an external Class 2, 12-24 VDC power source
• Power Consumption	1.05 W (220 mA@4.75 VDC)	6.5 W (640 mA @ 10.2 VDC)
• Recommended Fuse	No fuse required when directly connected to a PLC or PC with recommended cable.	Type AGC fast acting glass fuse, 750 mA, 250 VAC, ADC p/n AGC-75
• Maximum Inrush Current	1 A for 500 µs	10 A for 500 µs
• Acceptable External Power Drop Duration	Maximum 1 ms	

***NOTE: When the 6” panel is powered through Port1 from a connected PLC or PC, the screen brightness is diminished because the panel is running in Low-Power Mode. For full brightness, connect an external Class 2, 12-24 VDC power source to the 6” panel’s power connection. Low-Power Mode should be used during initial programming only. Connect an external Class 2, 12-24 VDC power source when the panel is installed in its application.**

Specifications		
EA1-T6CL		
Electrical		
	USB Bus Power (Programming only)*	**High Power Mode**
• Input Voltage Range	5.0 VDC (4.75 – 5.25 VDC)	12/24 VDC (10.2 – 26.4 VDC)
• Input Power	Supplied from a PC USB.	Supplied from an external Class 2, 12-24 VDC power source
• Power Consumption	2 W (420 mA @ 4.75 VDC)	6.5 W (640 mA @ 10.2 VDC)
• Recommended Fuse	No fuse required when directly connected to a PLC or PC with recommended cable.	Type AGC fast acting glass fuse, 750 mA, 250 VAC, ADC p/n AGC-75
• Maximum Inrush Current	4.5 A for 800 µs	13 A for 800 µs
• Acceptable External Power Drop Duration	Maximum 1 ms	

***NOTE: The EA1-T6CL can be powered through Port1 when connected to a PC for programming, the screen brightness is diminished because the panel is running in Low-Power Mode. For full brightness, connect an external Class 2, 12-24 VDC power source to the 6” panel’s power connection. An external Class 2, 12-24 VDC power source must be used when the panel is installed in its application.**

PLC Drivers	
Serial - port1 or port2	**Serial - port2 only**
AutomationDirect Productivity Series	Allen-Bradley DF1 Half Duplex
AutomationDirect Do-more	Allen-Bradley DF1 Full Duplex
AutomationDirect CLICK	Allen-Bradley PLC5 DF1
AutomationDirect K-sequence	Allen-Bradley DH485
AutomationDirect DirectNET	GE SNPX (90/30, 90/70, Micro 90, VersaMax Micro)
AutomationDirect Modbus	Mitsubishi FX
Modicon Modbus RTU	Mitsubishi Q & QnA
Entivity Modbus RTU	Omron Host Link (C200 Adapter, C500)
	Omron FINS Serial (CJ1, CS1)
	Siemens PPI (S7-200 CPU)
	AutomationDirect SOLO Temperature Controller
	AutomationDirect GS Drives

***NOTE: EA1-T6CL cannot be powered by a PLC and cannot communicate with a PLC through Port1**

For a list of supported protocols and cabling options refer to the 4” & 6” *C-more* Micro-Graphic Protocols and cabling chart starting on page 11-61.

C-more 6” Micro-Graphic Power Connection Wiring

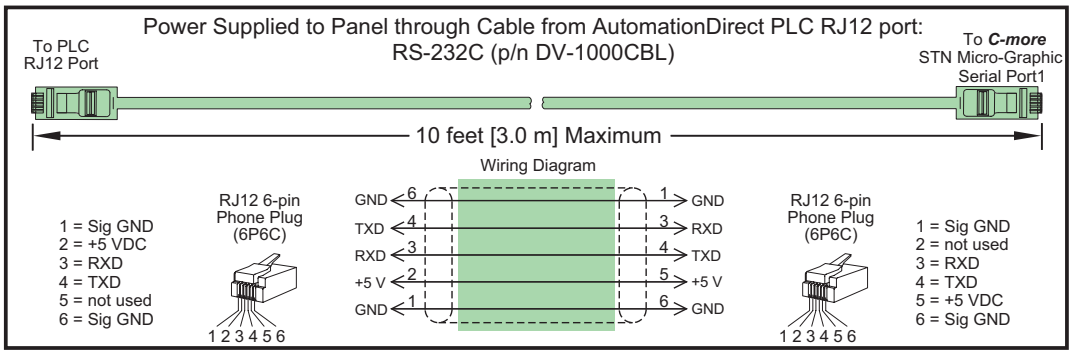
Providing power to the touch panel

1.) During operation, the panel functions in High-Power Mode when powered by a minimum 1 Amp 12 - 24 VDC power source. Recommended power supplies are AutomationDirect part number PSC-24-015 or PSC-24-030.

2.) *C-more* Micro-Graphic STN panels EA1-S6ML and EA1-S6MLW are powered during programming from the PC through the USB to RS-232 Programming Cable Assembly, EA-MG-PGM-CBL. *C-more* Micro-Graphic TFT panel EA1-T6CL is powered during programming through a USB A-to-B cable such as USB-CBL-AB6. The panel will operate in Low-power mode when powered by the PC and result in a dim screen.*

3.) Optionally, the *C-more* Micro-Graphic STN panels EA1-S6ML and EA1-S6MLW can function in Low-Power Mode powered from most AutomationDirect PLC’s RJ12 serial communications port. Use a DV-1000CBL communications cable, or a FA-15HD 15-pin HD DSub/RJ12 Adapter connected to most AutomationDirect PLC’s 15-pin HD communications port (DL06, D2-250-1 & D2-260) for Low-Power operation. See Chapter 6: PLC Communications in the Hardware User’s Manual (P/N: EA1-MG6-USER-M) for additional details. The panel will operate in low-power mode when powered by the PLC. The *C-more* Micro-Graphic TFT panel EA1-T6CL cannot be powered from a PLC.

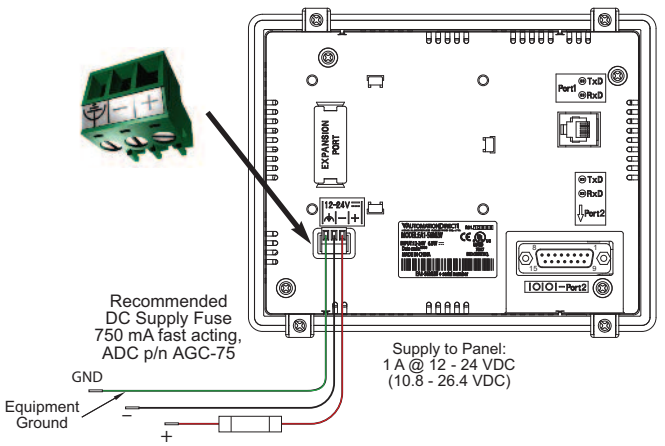
EA1-S6ML or EA1-S6MLW powered from an AutomationDirect PLC via communications cable


Power Supplied to Panel through Cable from AutomationDirect PLC RJ12 port:
RS-232C (p/n DV-1000CBL)
To PLC RJ12 Port
To C-more STN Micro-Graphic Serial Port1
10 feet [3.0 m] Maximum
Wiring Diagram
1 = Sig GND
2 = +5 VDC
3 = RXD
4 = TXD
5 = not used
6 = Sig GND
RJ12 6-pin Phone Plug (6P6C)
1 2 3 4 5 6
GND 6 — 1 GND
TXD 4 — 3 RXD
RXD 3 — 4 TXD
+5 V 2 — 5 +5 V
GND 1 — 6 GND
RJ12 6-pin Phone Plug (6P6C)
1 2 3 4 5 6
1 = Sig GND
2 = not used
3 = RXD
4 = TXD
5 = +5 VDC
6 = Sig GND

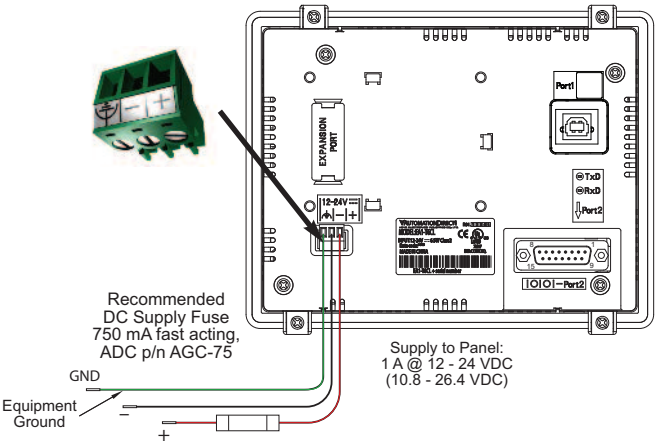
***NOTE: When the panel is powered through Port1, the screen brightness is diminished. For full brightness, connect an external Class 2, 12-24 VDC power source to the panel’s power connection. Low-Power Mode should be used during initial programming only. Connect an external Class 2, 12-24 VDC power source when the panel is installed in its application.**

6” Panel powered from a DC power source – wiring diagram

EA1-S6ML & EA1-S6MLW



EA1-T6CL



NOTE: Recommended DC power supply to power the *C-more* Micro-Graphic Panel, *AutomationDirect* Part No. PSC-24-015 or PSC-24-030.

C-more 6" Micro-Graphic Panel Accessories

20-Button Keypad Bezel, Landscape Orientation

The 20-button keypad bezel is designed to be used with all *C-more* 6" Micro-Graphic panels. The keypad includes four directional arrow cursor buttons, a full numeric keypad, and one each of an ESCAPE, MENU, CLEAR and ENTER button. The keypad is intended to be used with the numeric entry object (Style 3) to allow changing of a value, and can also be used to navigate and select screen objects. The numeric buttons can be used to enter a new value, along with the ENTER and CLEAR buttons. The 6" panels mount directly into the bezel; no panel configuration is required.

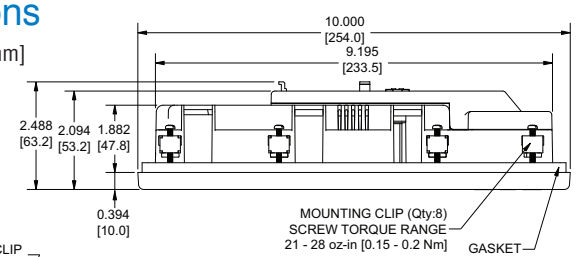
Part No. EA-MG6-BZ2

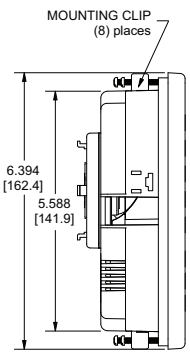
<---->

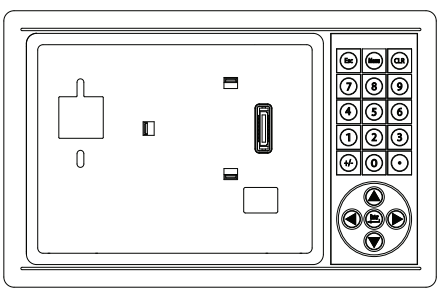
Four directional cursor buttons, numeric buttons and ESC, MENU, CLEAR and ENTER buttons.

Dimensions

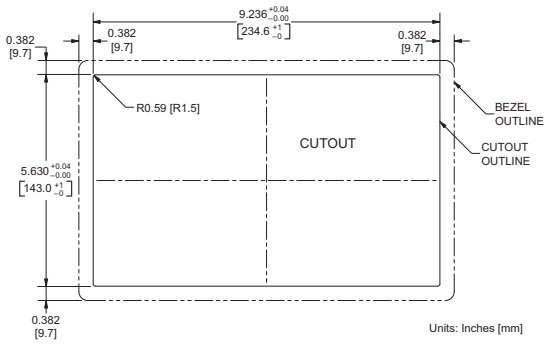
Units: inches [mm]



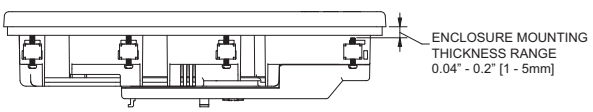




Panel Cutout



Panel Thickness



20-Button Keypad Bezel Specifications	
Part Number	**EA-MG6-BZ2**
General	
• Micro-Graphic Panels Supported	EA-S6ML, EA-S6MLW, EA1-T6CL
• Connection	Connects with expansion connector on the rear of the ***C-more*** 6" Micro-Graphic panel.
• Power Consumption	None
• Keypad Button Life	Minimum of 500,000 cycles
• Enclosure Mounting	(8) mounting clips, EA-MG-BZ2-BRK, included.
	Note: The ***C-more*** 6" Micro-Graphic panel is installed into the keypad bezel using the (4) mounting clips, EA-MG-BZ2-BRK, that are supplied with the panel.
Physical	
• Dimensions	10.000" (W) x 6.394" (H) x 2.488" (D) [254.0 mm x 162.4 mm x 63.2 mm]
• Weight	26.1 oz. [740 g]
Environmental:	See Micro-Graphic panel specifications at the beginning of this catalog section

C-more 6” Micro-Graphic Panel Accessories

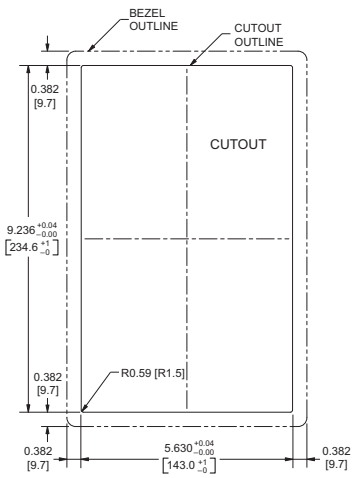
21-Button Keypad Bezel, Portrait Orientation

The 21-button keypad bezel is designed to be used with all *C-more* 6” Micro-Graphic panels. The keypad includes four directional arrow cursor buttons, a full numeric keypad, and one each of an ESCAPE, MENU, CLEAR and two ENTER buttons. The keypad is intended to be used with the numeric entry object (Style 3)to allow changing of a value, and can also be used to navigate & select screen objects. The numeric buttons can be used to enter a new value, along with the ENTER and CLEAR buttons. The 6” panels mount directly into the bezel; no panel configuration is required.

Part No. EA-MG6-BZ2P

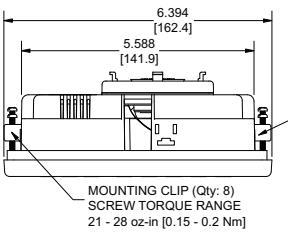
<---->

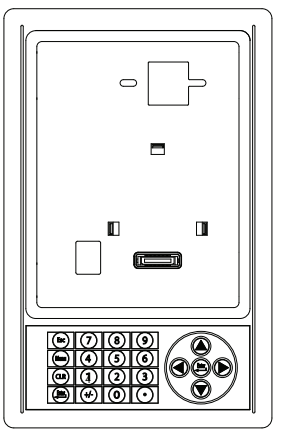
Panel Cutout

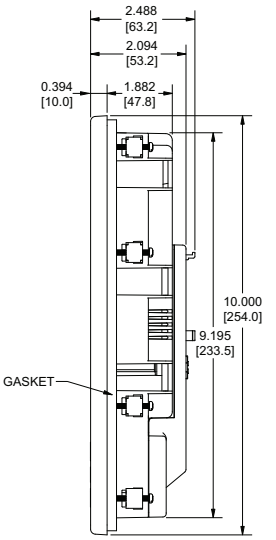


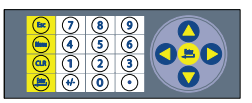
Dimensions

Units: inches [mm]



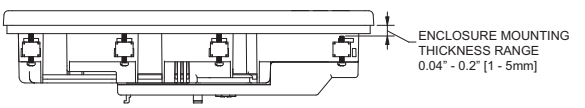






Four directional cursor buttons, numeric buttons, and ESC, MENU, CLEAR and ENTER buttons.

Panel Thickness



21-Button Keypad Bezel Specifications	
Part Number	**EA-MG6-BZ2P**
General	
• ***Micro-Graphic Panels Supported***	EA-S6ML, EA-S6MLW, EA1-T6CL
• ***Connection***	Connects with expansion connector on the rear of the ***C-more*** 6” Micro-Graphic panel.
• ***Power Consumption***	None
• ***Keypad Button Life***	Minimum of 500,000 cycles
• ***Enclosure Mounting***	(8) mounting clips, EA-MG-BZ2-BRK, included.
	Note: The ***C-more*** 6” Micro-Graphic panel is installed into the keypad bezel using the (4) mounting clips, EA-MG-BZ2-BRK, that are supplied with the panel.
Physical	
• ***Dimensions***	6.394” (W) x 10.000” (H) x 2.488” (D) [162.4 mm x 254.0 mm x 63.2 mm]
• ***Weight***	26.1 oz. [740 g]
Environmental	See Micro-Graphic panel specifications at the beginning of this catalog section

C-more 6" Micro-Graphic Panel Accessories

D-SUB 15-pin 90-degree Communication Port Adapter

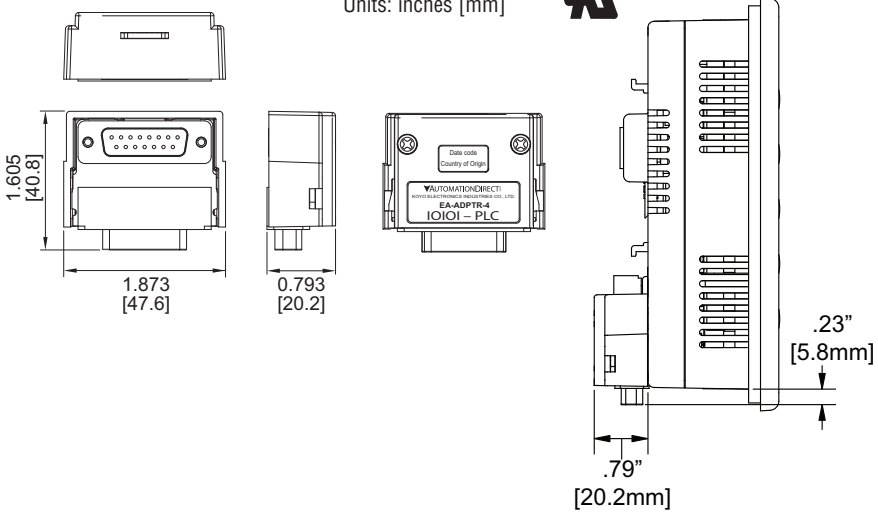
The EA-ADPTR-4 adapter plugs into the 15-pin serial port on the rear of a 6" panel to allow a controller communication cable to be plugged in at a 90 degree angle to reduce panel depth requirements. 15-pin straight through pin-out. UL Recognized.

Part No.
EA-ADPTR-4

<--->

Dimensions

Units: inches [mm]



D-SUB 15-pin to Terminal Block Adapter

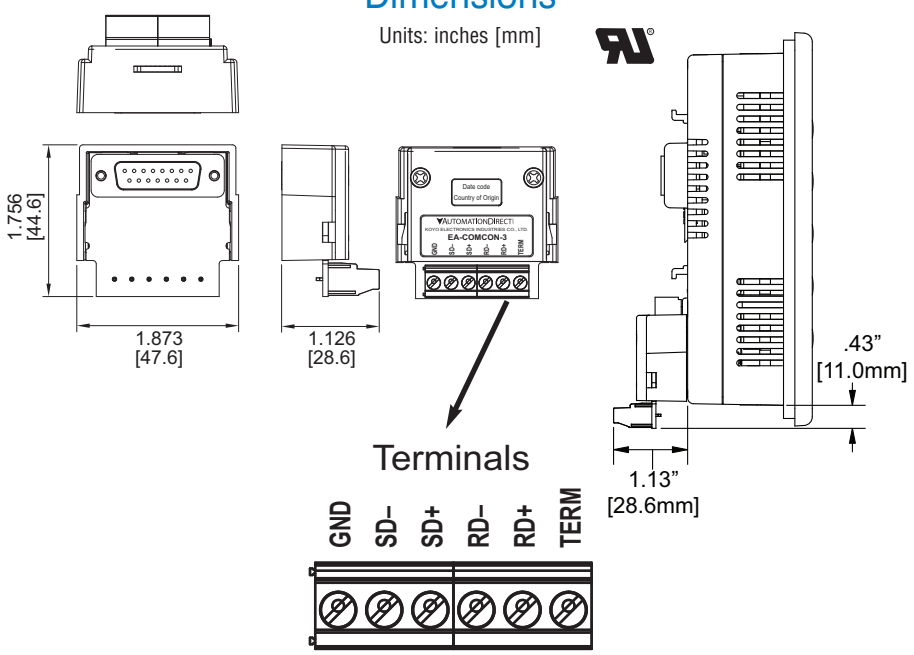
The EA-COMCON-3 adapter plugs into the 15-pin serial port on the rear of a 6" panel to allow wire terminal connections for an RS-422/RS-485/DH-485 PLC communication cable. UL Recognized.

Part No.
EA-COMCON-3

<--->

Dimensions

Units: inches [mm]



C-more 6" Micro-Graphic Panel Accessories

Clear Screen Overlay

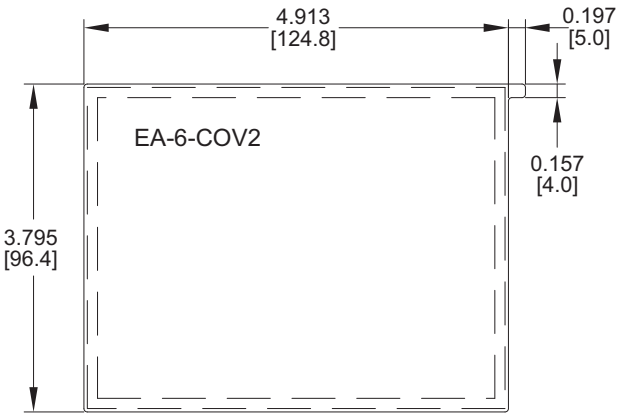
Optional clear screen overlay used to protect *C-more* 6" Micro-Graphic displays from minor scratches and wear. Package contains 3 clear screen overlays.

Part No. EA-6-COV2

<--->

Dimensions

Units: inches [mm]



Clear Screen Overlay Installation

Step 1

Remove the overlay from the package

Step 2

Remove the paper backing from the overlay

Step 3

Align the overlay with the screen and press the adhesive firmly into place

Step 4

Remove the protective film*

***Note: The overlay cover ships with a thin protective film on the face that should be carefully removed after installation.**

C-more 6" Micro-Graphic Replacement Parts

The optional replacement parts can be used to replace damaged, worn or lost *C-more* 6" Micro-Graphic panel components.

Replacement parts at a glance:

Part Number	Description	Price
EA-MG-BZ2-BRK	Replacement mounting clip for 4" and 6" ***C-more*** Micro-Graphic panels and 6" keypad bezels. Also used to mount the ***C-more*** 3" Micro-Graphic bezel EA-MG-BZ2. (pk of 8)	<--->
EA-MG-DC-CON	Replacement adapter DC power connector (pk of 5)	<--->
EA-MG6-S6ML-GSK	Replacement mounting gasket for ***C-more*** 6" Micro-Graphic panels	<--->
EA-MG6-BZ2-GSK	Replacement mounting gasket for ***C-more*** 6" Micro-Graphic keypad bezels EA-MG6-BZ2 and EA-MG6-BZ2P	<--->
EA-MG6-S6ML-FKL	Replacement function key label insert for ***C-more*** 6" Micro-Graphic panels (pk of 5; 3 blank, 1 F1-F5 for landscape, 1 F1-F5 for portrait)	<--->

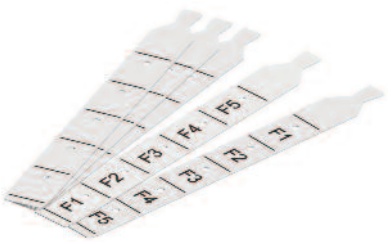
Panel Mounting Clips
Part No. EA-MG-BZ2-BRK

(pk of 8)

DC Power Connector
Part No. EA-MG-DC-CON

(pk of 5)

Function Keys Label Inserts
Part No. EA-MG6-S6ML-FKL



(pk of 5; 3 blank, 1 F1-F5 for landscape, 1 F1-F5 for portrait)

Panel Gasket
Part No. EA-MG6-S6ML-GSK

Keypad Bezel Gasket
Part No. EA-MG6-BZ2-GSK

C-more 4" & 6" Micro-Graphic PLC Connections

Cabling requirements

When using the built in RJ12 serial port (Port1) on models EA1-S6ML or EA1-S6MLW to connect with the CLICK, ProductivitySeries, DL05, DL06, DL105, DL205, D3-350 and DL405 CPUs, your cabling choices are fairly simple.

- **DV-1000CBL — connects to CLICK, P3-550, DL05, DL06, DL105, DL205, D3-350 and D4-450 phone jack.**
- **D4-1000CBL — connects to all DL405 CPU 15-pin ports.**

A maximum cable length of **10 feet** between the EA1-S6ML or EA1-S6MLW and the PLC is recommended when powering the panel in Low-Power Mode from the PLC. The EA1-T4CL and EA1-T6CL cannot be powered from a PLC.

The *C-more* 4" and 6" Micro-Graphic panels can communicate through its built-in 15-pin serial port (Port2) via RS-232, RS-422 and RS-485 using these cables.

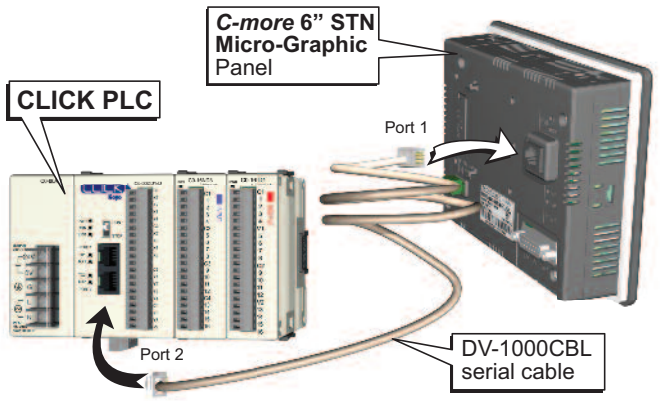
- **EA-2CBL — connects to CLICK, P3-550, DL05, DL105, DL205, D3-350 and D4-450 phone jack.**
- **EA-2CBL-1 — connects to D2-250, D250-1, D2-260, DL06 VGA connector.**

The EA1-T4CL and EA1-T6CL can only communicate to a controller through the 15-pin serial Port2; the USB Port1 on these TFT models is for programming only.

Drivers for your Controller

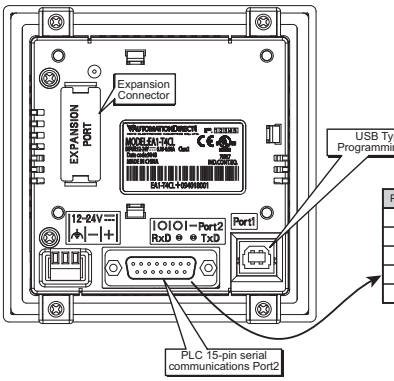
- AutomationDirect Productivity Series
- AutomationDirect Do-more
- AutomationDirect CLICK (Modbus)
- ***Direct***LOGIC K-sequence, *Direct*LOGIC *Direct*NET, ***Direct***LOGIC Modbus (Koyo Addressing)
- Modbus RTU
- Allen Bradley DF1 Full Duplex, Allen Bradley DF1 Half Duplex, Allen Bradley PLC5 DF1, AB DH485
- Omron Host Link (C200 Adapter, C500) Omron FINS serial (CJ1, CS1)
- GE SNPX (90/30, 90/70, Micro 90, VersaMax Micro)
- Mitsubishi Melsec FX
- Siemens PPI
- Entivity Modbus RTU
- AutomationDirect GS Drives
- AutomationDirect SOLO Temperature Controllers
- Mitsubishi Q/QnA

C-more 6" STN Micro-Graphic Port 1 to CLICK PLC Port 2



Communication Ports

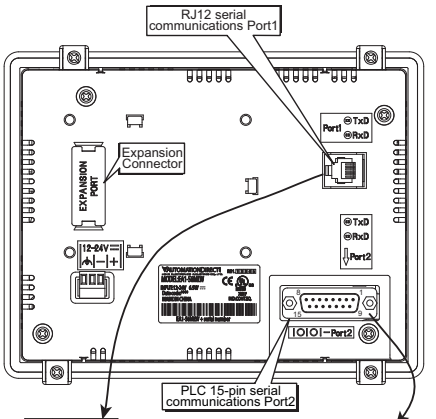
EA1-T4CL



Pin	Signal	Pin	Signal	Pin	Signal
1	Frame GND	6	LE	11	TXD+ (422/485)
2	TXD (232C)	7	CTS (232C)	12	TXD– (422/485)
3	RXD (232C)	8	RTS (232C)	13	Term. Resistor
4	Future	9	RXD+ (422/485)	14	do not use
5	Logic GND	10	RXD– (422/485)	15	do not use

RS-232/422/485

EA1-S6ML & EA1-S6MLW



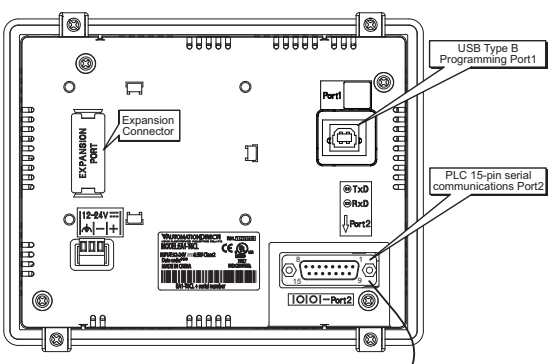
Pin	Signal
1	Logic GND
2	not used
3	RXD (232C)
4	TXD (232C)
5	+5 VDC
6	Logic GND

RS-232

Pin	Signal	Pin	Signal	Pin	Signal
1	Frame GND	6	LE	11	TXD+ (422/485)
2	TXD (232C)	7	CTS (232C)	12	TXD– (422/485)
3	RXD (232C)	8	RTS (232C)	13	Term. Resistor
4	Future	9	RXD+ (422/485)	14	do not use
5	Logic GND	10	RXD– (422/485)	15	do not use

RS-232/422/485

EA1-T6CL



Pin	Signal	Pin	Signal	Pin	Signal
1	Frame GND	6	LE	11	TXD+ (422/485)
2	TXD (232C)	7	CTS (232C)	12	TXD– (422/485)
3	RXD (232C)	8	RTS (232C)	13	Term. Resistor
4	Future	9	RXD+ (422/485)	14	do not use
5	Logic GND	10	RXD– (422/485)	15	do not use

RS-232/422/485

C-more 4" & 6" Micro-Graphic Communication Protocols & Cabling Chart

Controller Compatibility & Connection Chart

PLC			*C-more 4" and 6" Micro-Graphic Panel*			
			Panel to PLC Cabling Components Required for Specific Port and Protocol being used.			
			**PLC Port Powered or External DC Power Supply		External DC Power Supply	
			Using panel's RJ12 Port1		Using panel's Port2 DB 15-pin - female	
Family	*CPU*	*PLC Port & Type*	Protocol(s) Supported	Components & Network Type	Protocol(s) Supported	Components & Network Type
CLICK	all versions	Port 1 RJ12 - 6 pin	AutomationDirect Modbus (CLICK)	DV-1000CBL** RS-232	AutomationDirect Modbus (CLICK)	EA-2CBL RS-232
		Port 2 RJ12 - 6 pin				
	Analog CPU's	Port3 Term block 3-pin		N/A		* See Note RS-485
Productivity Series	all versions	RS-232 RJ12 - 6 pin	AutomationDirect Productivity3000 Serial (P3-550)	DV-1000CBL** RS-232	AutomationDirect Productivity3000 Serial (P3-550)	EA-2CBL RS-232
		RS-485 Port Term block 3-pin		N/A		* See Note RS-485
Do-more	all versions	Port 2 RJ12 - 6 pin	AutomationDirect Do-more Serial	DV-1000CBL** RS-232	AutomationDirect Do-more Serial	EA-2CBL RS-232
***Direct*LOGIC DL05**	all versions	Port 1 RJ12 - 6 pin	K-sequence, ***Direct*** NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct*** NET, Modbus RTU	EA-2CBL RS-232
		Port 2 RJ12 - 6 pin				
	D0-DCM	Port 1 RJ12 - 6 pin	K-sequence, ***Direct*** NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct*** NET, Modbus RTU	EA-2CBL RS-232
		Port 2 DB15HD (female)		DV-1000CBL** + FA-15HD RS-232		EA-2CBL-1 RS-232
						* See Note RS-422
					Modbus RTU	* See Note RS-485 Modbus only
***Direct*LOGIC DL06**	all versions	Port 1 RJ12 - 6 pin	K-sequence, ***Direct*** NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct*** NET, Modbus RTU	EA-2CBL RS-232
		Port 2 DB15HD (female)		DV-1000CBL** + FA-15HD RS-232		EA-2CBL-1 RS-232
						* See Note RS-422
					Modbus RTU	* See Note RS-485 Modbus only
	D0-DCM	Port 1 RJ12 - 6 pin	K-sequence, **Direct** NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct*** NET, Modbus RTU	EA-2CBL RS-232
		Port 2 DB15HD (female)		DV-1000CBL** + FA-15HD RS-232		EA-2CBL-1 RS-232
						* See Note RS-422
					Modbus RTU	* See Note RS-485 Modbus only
***Direct*LOGIC DL105**	all versions	Port 1 RJ12 - 6 pin	K-sequence	DV-1000CBL** RS-232	K-sequence	EA-2CBL RS-232

*** Note: See the *C-more* Micro-Graphic Hardware User Manuals (P/N: EA1-MG6-USER-M or EA1-TCL-M), Chapter 6: PLC Communications, for wiring diagrams that the user can use to construct their own cables. The manual is available for download at www.automationdirect.com.**

**** Note: For EA1-S6ML and EA1-S6MLW,the PLC can provide 5 VDC through this cable. No external 12-24 VDC souce is required, however, screen brightness is diminished and the alarm beep will not function. Low-Power Mode should be used during initial programming only. Connect an external Class 2, 12-24 VDC power source when the panel is installed in its application. EA1-T4CL and EA1-T6CL require an external power supply. PLC Compatibility & Connection Chart continued on next page.**

C-more 4" & 6" Micro-Graphic Communication Protocols & Cabling Chart (cont'd)

Controller Compatibility & Connection Chart						
PLC			***C-more 4" and 6" Micro-Graphic Panel***			
			Panel to PLC Cabling Components Required for Specific Port and Protocol being used.			
			****PLC Port Powered or External DC Power Supply**		**External DC Power Supply**	
			Using panel's RJ12 port 1		Using panel's Port2 DB 15-pin - female	
Family	***CPU***	***Port & Type***	Protocol(s) Supported	Components & Network Type	Protocol(s) Supported	Components & Network Type
***Direct*LOGIC DL205**	D2-230	Port 1 RJ12 - 6 pin	K-sequence	DV-1000CBL** RS-232	K-sequence	EA-2CBL RS-232
	D2-240	Port 1 RJ12 - 6 pin	K-sequence	DV-1000CBL** RS-232	K-sequence	EA-2CBL RS-232
		Port 2 RJ12 - 6 pin	K-sequence, **Direct** NET,		K-sequence, **Direct** NET,	
	D2-250-1	D2-250-1	K-sequence, **Direct** NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct*** NET, Modbus RTU	EA-2CBL RS-232
		Port 2 DB15HD (female)		DV-1000CBL** + FA-15HD RS-232		EA-2CBL-1 RS-232
						* See Note RS-422
	D2-260	Port 1 RJ12 - 6 pin	K-sequence, ***Direct***NET, Modbus RTU	DV-1000CBL** RS-232	K-sequence, ***Direct***NET, Modbus RTU	EA-2CBL RS-232
		Port 2 DB15HD (female)		DV-1000CBL + FA-15HD RS-232		EA-2CBL-1 RS-232
						* See Note RS-422
					Modbus RTU	* See Note RS-485 Modbus only
	D2-DCM	Port 1 DB 25 pin (female)	K-sequence, ***Direct***NET, Modbus RTU	See Note RS-232	***Direct***NET	EA-4CBL-2 RS-232
						* See Note RS-422
	WINPLC	Port 1 RJ12 - 6 pin	Modbus RTU	DV-1000CBL** RS-232	Modbus RTU	EA-2CBL RS-232
***Direct*LOGIC DL305**	D3-330 or D3-340	D3-232-DCU DB 25 pin (female)	***Direct***NET	EA-4CBL-2 RS-232	***Direct***NET	EA-4CBL-2 RS-232
		D3-422-DCU DB 25 pin (female)	N/A		***Direct***NET	*See Note RS-422
	D3-340	Port 1 RJ11 - 4 pin	***Direct***NET	OP-3CBL-1** RS-232	***Direct***NET	EA-3CBL RS-232
		Port 2 RJ11 - 4 pin	***Direct***NET, Modbus RTU		***Direct***NET, Modbus RTU	
	D3-350	Port 1 RJ12 - 6 pin	K-sequence, ***Direct***NET	DV-1000CBL** RS-232	K-sequence, ***Direct***NET	EA-2CBL RS-232
		Port 2 DB 25 pin (female)	K-sequence, ***Direct***NET, Modbus RTU	*See Note RS-232	K-sequence, ***Direct***NET, Modbus RTU	EA-4CBL-2 RS-232
						See Note RS-422
	D3-DCM D3-350 only	Port 1 DB 25 pin (female)	K-sequence, ***Direct***NET, Modbus RTU	*See Note RS-232	***Direct***NET	EA-4CBL-2 RS-232
						*See Note RS-422

*** Note: See the *C-more* Micro-Graphic Hardware User Manuals (P/N: EA1-MG6-USER-M or EA1-TCL-M), Chapter 6: PLC Communications, for wiring diagrams that the user can use to construct their own cables. The manual is available for download at www.automationdirect.com.**

**** Note: For EA1-S6ML and EA1-S6MLW,the PLC can provide 5 VDC through this cable. No external 12-24 VDC souce is required, however, screen brightness is diminished and the alarm beep will not function. Low-Power Mode should be used during initial programming only. Connect an external 12-24 VDC power source when the panel is installed in its application. EA1-T4CL and EA1-T6CL require an external power supply. PLC Compatibility & Connection Chart continued on next page.**

C-more 4" & 6" Micro-Graphic Communication Protocols & Cabling Chart (cont'd)

Controller Compatibility & Connection Chart						
PLC			***C-more 4" and 6" Micro-Graphic Panel***			
			Panel to PLC Cabling Components Required for Specific Port and Protocol being used.			
			****PLC Port Powered or External DC Power Supply**		**External DC Power Supply**	
			Using panel's RJ12 port 1		Using panel's Port2 DB 15-pin - female	
Family	***CPU***	***Port & Type***	Protocol(s) Supported	Components & Network Type	Protocol(s) Supported	Components & Network Type
***Direct*LOGIC DL405**	D4-430	Port 0 DB 15 pin (female)	K-sequence	**D4-1000CBL or DV-1000CBL** & FA-CABKIT** RS-232	K-sequence	**EA-4CBL-1** RS-232
		Port 1 DB 25 pin (female)	K-sequence, ***Direct*NET**	**DV-1000CBL & FA-CABKIT** RS-232	K-sequence, ***Direct*NET**	**EA-4CBL-2** RS-232 ***See Note** RS-422
	D4-440	Port 0 DB 15 pin (female)	K-sequence	**D4-1000CBL or DV-1000CBL** & FA-CABKIT** RS-232	K-sequence	**EA-4CBL-1** RS-232
		Port 1 DB 25 pin (female)	K-sequence, ***Direct*NET**	**DV-1000CBL** & FA-CABKIT** RS-232	K-sequence, ***Direct*NET**	**EA-4CBL-2** RS-232 ***See Note** RS-422
	D4-450	Port 0 DB 15 pin (female)	K-sequence	**D4-1000CBL or DV-1000CBL** & FA-CABKIT** RS-232	K-sequence	**EA-4CBL-1** RS-232
		Port 1 DB 25 pin (female)	K-sequence, ***Direct*NET**, Modbus RTU	**DV-1000CBL** & FA-CABKIT** RS-232	K-sequence, ***Direct*NET**, Modbus RTU	EA-4CBL-2 RS-232 ***See Note** RS-422
		Port 3 DB 25 pin (female)	N/A		K-sequence, ***Direct*NET**, Modbus RTU	***See Note** RS-422
		Port 2 RJ12 - 6 pin	K-sequence, ***Direct*NET**	**DV-1000CBL**** RS-232	K-sequence, ***Direct*NET**	**EA-2CBL** RS-232
	D4-DCM	Port 1 DB 25 pin (female)	K-sequence, ***Direct*NET**, Modbus RTU	***See Note** RS-232	***Direct*NET**	**EA-4CBL-2** RS-232 ***See Note** RS-422
SOLO	N/A	Data +/- terminals	N/A		SOLO Temperature Controller	***See Note** RS-485
GS Drives	N/A	RS-485 Interface	N/A		GS Drives Serial GS Drives TCP/IP (GS-EDRV)	***See Note** RS-485

*** Note: See the *C-more* Micro-Graphic Hardware User Manuals (P/N: EA1-MG6-USER-M or EA1-TCL-M), Chapter 6: PLC Communications, for wiring diagrams that the user can use to construct their own cables. The manual is available for download at www.automationdirect.com.**

**** Note: For EA1-S6ML and EA1-S6MLW,the PLC can provide 5 VDC through this cable. No external 12-24 VDC souce is required, however, screen brightness is diminished and the alarm beep will not function. Low-Power Mode should be used during initial programming only. Connect an external Class 2, 12-24 VDC power source when the panel is installed in its application. EA1-T4CL and EA1-T6CL require an external power supply. PLC Compatibility & Connection Chart continued on next page.**

C-more 4" & 6" Micro-Graphic Communication Protocols & Cabling Chart (cont'd)

Controller Compatibility & Connection Chart						
PLC			***C-more 4" and 6" Micro-Graphic Panel***			
			Panel to PLC Cabling Components Required for Specific Port and Protocol being used.			
			****PLC Port Powered or External DC Power Supply**		**External DC Power Supply**	
			Using panel's RJ12 port 1		Using panel's Port2 DB 15-pin - female	
Family	***CPU***	***Port & Type***	Protocol(s) Supported	Components & Network Type	Protocol(s) Supported	Components & Network Type
Allen-Bradley MicroLogix	1000, 1100, 1200, 1400, 1500	8-pin mini-din port	N/A		DF1 Full Duplex DF1 Half Duplex	EA-MLOGIX-CBL RS-232
		RJ45 8-pin phone plug			DH485/AIC/AIC+	EA-DH485-CBL RS-232
Allen-Bradley SLC500	5/03, 5/04, 5/05	9-pin D-sub port			DF1 Full Duplex DF1 Half Duplex	EA-SLC-232-CBL RS-232
	5/01, 5/02, 5/03	RJ45 8-pin phone plug			DH485/AIC/AIC+	EA-DH485-CBL RS-232
Allen-Bradley ControlLogix	all	9-pin D-sub port			DF1 Full Duplex DF1 Half Duplex	EA-SLC-232-CBL RS-232
Allen-Bradley CompactLogix	all	9-pin D-sub port			DF1 Full Duplex DF1 Half Duplex	EA-SLC-232-CBL RS-232
Allen-Bradley FlexLogix	all	9-pin D-sub port			DF1 Full Duplex DF1 Half Duplex	EA-SLC-232-CBL RS-232
Allen-Bradley PLC5	all	25-pin D-sub port			DF1 Full Duplex	EA-PLC5–232-CBL RS-232
		RJ45 8-pin phone plug			DH485/AIC/AIC+	EA-DH485-CBL RS-232
GE	90/30	15-pin D-sub port			SNPX	EA-90-30-CBL RS-422
	Micro 90, VersaMax Micro	RJ45 Port 1				*See Note RS-232
		15-pin D-sub port Port 2				EA-90-30-CBL RS-422
Mitsubishi	Melsec FX Series	25-pin D-sub port			CPU Direct	EA-MITSU-CBL RS-422
		8-pin mini-din port				EA-MITSU-CBL-1 RS-422
	Q / QnA	9-pin D-sub port			Q / QnA	*See Note RS-232
		6-pin mini-din port				*See Note RS-232
Omron	C200 (Adapter), C500	25-pin D-sub port			Host Link	EA-OMRON-CBL RS-232
	CJ1, CS1, CQM1, CPM1, CPM2, C200	9-pin D-sub port			FINS	*See Note RS-232
Modicon	984 CPU, Quantum 113 CPU, AEG Modicon Micro Series 110 CPU	varies			Modbus RTU	*See Note RS-232
Siemens	S7-200 CPU	9-pin D-sub port 0 or 1			PPI	*See Note RS-485

*** Note: See the *C-more* Micro-Graphic Hardware User Manuals (P/N: EA1-MG6-USER-M or EA1-TCL-M), Chapter 6: PLC Communications, for wiring diagrams that the user can use to construct their own cables. The manual is available for download at www.automationdirect.com.**

**** Note: For EA1-S6ML and EA1-S6MLW,the PLC can provide 5 VDC through this cable. No external 12-24 VDC souce is required, however, screen brightness is diminished and the alarm beep will not function. Low-Power Mode should be used during initial programming only. Connect an external Class 2, 12-24 VDC power source when the panel is installed in its application. EA1-T4CL and EA1-T6CL require an external power supply.**

C-more 4" & 6" Micro-Graphic Communication Cables and Cable Kits

Cable Description	Cable Part Number	Price
Cables for direct connect to panel's serial Port1 (EA1-S6ML and EA1-S6MLW powered from PLC's serial port. EA1-T4CL and EA1-T6CL cannot be powered by a PLC and cannot communicate with a PLC through Port1.)		
AutomationDirect Productivity Series, Do-more, CLICK, *Direct*LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450 & H2-WinPLC (RS-232C).	***DV-1000CBL***	<--->
*Direct*LOGIC DL405 PLC 15-pin D-sub port, DL405 (RS-232C).	***D4-1000CBL***	<--->
*Direct*LOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C). **Use with DV-1000CBL cable.**	***FA-15HD***	<--->
*Direct*LOGIC PLC 15-pin D-sub port, DL405 (RS-232C). **Use with DV-1000CBL cable.**	***FA-CABKIT***	<--->
*Direct*LOGIC PLC RJ-11 port, D3-340 (RS-232C).	***OP-3CBL-1***	<--->
Cables used with serial Port2		
AutomationDirect Productivity Series, Do-more, CLICK, *Direct*LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450 & H2-WinPLC (RS-232C).	***EA-2CBL***	<--->
*Direct*LOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C).	***EA-2CBL-1***	<--->
*Direct*LOGIC PLC RJ-11 port, D3-340 (RS-232C).	***EA-3CBL***	<--->
*Direct*LOGIC DL405 PLC 15-pin D-sub port, DL405 (RS-232C).	***EA-4CBL-1***	<--->
*Direct*LOGIC PLC 25-pin D-sub port, DL405, D3-350, DL305 DCU and all DCM's (RS-232C).	***EA-4CBL-2***	<--->
Allen-Bradley MicroLogix 1000, 1100, 1200, 1400 & 1500 (RS-232C)	***EA-MLOGIX-CBL***	<--->
Allen-Bradley SLC 5-03/04/05, ControlLogix, CompactLogix, FlexLogix DF1 port (RS-232C)	***EA-SLC-232-CBL***	<--->
Allen-Bradley PLC-5 DF1 port (RS-232C)	***EA-PLC5-232-CBL***	<--->
Allen-Bradley MicroLogix, SLC-5-01/02/03, PLC5 DH485 port (RS-232C)	***EA-DH485-CBL***	<--->
GE 90/30 and 90/70, Micro 90, VersaMax Micro (Port 2) 15-pin D-sub port (RS-422A)	***EA-90-30-CBL***	<--->
MITSUBISHI FX Series 25-pin port (RS-422A)	***EA-MITSU-CBL***	<--->
MITSUBISHI FX Series 8-pin mini-DIN (RS-422A)	***EA-MITSU-CBL-1***	<--->
OMRON Host Link C200 Adapter, C500 (RS-232C)	***EA-OMRON-CBL***	<--->

DV-1000CBL

D4-1000CBL

OP-3CBL-1

FA-15HD

FA-CABKIT

EA-2CBL-1

EA-2CBL

EA-4CBL-1

EA-3CBL

EA-MLOGIX-CBL

EA-4CBL-2

EA-PLC5-232-CBL

EA-SLC-232-CBL

EA-DH485-CBL

EA-90-30-CBL

EA-MITSU-CBL

EA-MITSU-CBL-1

EA-OMRON-CBL

C-more Micro-Graphic Programming Software

FREE software!

C-more Micro-Graphic Programming Software can be downloaded at no charge or a CD version may be purchased by ordering EA-MG-PGMSW. The software requires a USB port on your PC to connect to the *C-more* Micro-Graphic panel. Software Help Files are included in the download. This software programs all the *C-more* Micro-Graphic panels (does not program the *C-more* 6" through 15" touch panels).

Note: This software is used to program C-more Micro-Graphic panels only.
Part Numbers: EA1-S3ML, EA1-S3ML-N, EA1-S3MLW, EA1-S3MLW-N, EA1-T4CL, EA1-S6ML, EA1-S6MLW, EA1-T6CL

NOTE: Software and Firmware Version 3.0 or later is required with model EA1-T4CL.
Software and Firmware Version 2.50 or later is required with model EA1-T6CL.
Software and Firmware Version 2.0 or later is required with models EA1-S6ML and EA1-S6MLW.
Software and Firmware Version 1.5 or later is required with models EA1-S3MLW and EA1-S3MLW-N.
Available for free download at *www.automationdirect.com*.

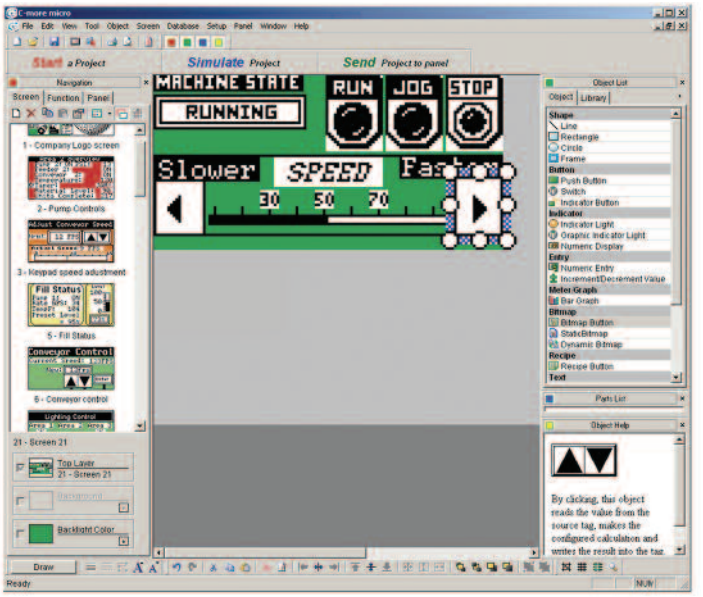
C-more Micro-Graphic Programming Software is a spin-off of its powerful sibling *C-more* Touch Panel. It offers very high end features designed to reduce your configuration time. Simply drag and drop the objects from the object list (right side of screen) onto the the screen construction area. Then configure your PLC tags and click on the objects you wish to use. Use the built-in simulator to review your work on your PC before ever downloading your project! The time saving benefits of the *C-more* Micro-Graphic configuration software could easily pay for the panel. Check out www.C moreMicro.com to download a free version.

Built-in project simulator

- Runs your project on your PC
- Test all of your screens before downloading
- Time savings pays for the panel
- Version 2.5 or later - Simulate function keys and keypad bezel.

Built-in user object/screen libraries

Save time by re-using your custom objects and screens.



Thumbnail project preview pane

Helps keep track of multi-screen projects.

Scrolling object selection window

Lets you find the object you want fast. Just drag and drop it on the screen.

PC requirements

Following are the minimum system requirements for running *C-more* Micro-Graphic Programming Software, EA-MG-PGMSW, on a PC:

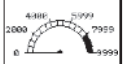
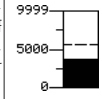
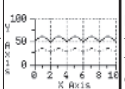
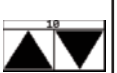
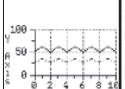
- Operating System - Windows® XP Home / Professional Edition Service Pack 2, Windows® 2000 with Service Pack 4, Windows® Vista (32 or 64 bit), Windows® 7 (32 or 64 bit) or Windows 8 (32 or 64 bit)
- Keyboard and Mouse or compatible pointing device
- Super VGA color video adapter and monitor with at least 800 x 600 pixels resolution (1024 x 768 pixels recommended) 64K color minimum
- 150 MB free hard-disk space
- CD-ROM or DVD drive for installing software from the CD, or internet access to download free programming software
- USB port to use with the correct Programming Cable Assembly for project transfer from the programming software to the panel

Scrolling help window

Gives you helpful information on each object

C-more Micro-Graphic Programming Software

C-more Micro-Graphic Panel Objects

Object	Graphic	Object	Graphic
The **Line** object, just like with drawing tools, allows the user to insert a straight line drawing into a project. When a Line is inserted into a project, a window opens to allow the user to setup all available parameters for the Line object. Some of the uses for Line Objects include but are not limited to adding callouts, pointers, or indicators.		The **Analog Meter** object is used to display the current value of a Tag Name.	
The **Rectangle** object, just like with drawing tools, allows the user to insert a drawing of a Rectangle as well as other geometric shapes into a project. When this object is inserted into a project, a window opens to allow the user to setup all available parameters for the Rectangle object.		The **Bar Meter** object is used to monitor up to two assigned Tag Names continuously. This object has various appearances depending upon the relative value of the tags. The Bar Meter can be used to create digital versions of level, current, and flow meters to name a few samples, or gauges that measure speed and other measurable data.	
The **Circle** object, just like with drawing tools, allows the user to insert a drawing of a Circle or ellipse shape into a project. When this object is inserted into a project, a window opens to allow the user to setup all available parameters for the Circle object.		The **Bitmap Button** object offers the ability to use a Bitmap graphic to perform the functions of a Button. This allows users to create their own graphics and implement them within the software project. The Bitmap Button object can be used to activate or deactivate components assigned to a Discrete Tag Name. The C-more Micro-Graphic display only supports two colors, black and white.	
The **Frame** object allows the user to insert a Frame to the project that can be used to Frame other objects. Some of the uses for Frame object include but are not limited to graphically separating objects for different operations that may appear on one screen and emphasizing pushbuttons or other objects that may require more attention by the operator.		The **Static Bitmap** offers the ability to display a Bitmap graphic on any screen. The Static Bitmap does not change state. Refer to the Dynamic Bitmap Object if you require the graphic object to change state based on a Tag Value in your PLC. The dialog box for a "Static Bitmap" object allows you to "read from disk" and select a graphic file for import. Graphics must be in one of the following formats: .BMP .WMF .JPG .JPEG	
The **Pushbutton** object is available from the Button Category of the Object List window. The Pushbutton object is an electronic version of a typical Pushbutton normally found on control panels. The Pushbutton object can be used to activate or deactivate components assigned to a Discrete Tag Name.		**Recipe** objects make it easy to make a large number of tag changes with the push of a single button. Create Recipes with up to 99 entries, and multiple sets of values. Then just push a button to load an entire set of values into the group of recipe tags.	
The **Switch** object is an electronic version of a typical Switch that normally can be found on control panels. The Switch object can be used to activate or deactivate components assigned to a Discrete Tag Name.		The **Dynamic Bitmap** object offers the ability to make an object using two different Bitmap graphics that will display one graphic when the Tag is On and a different graphic when the Tag is Off. Use your own bitmap designs or use some of the bitmaps provided with the software that are located in the User Graphic Library.	
The **Indicator Button** object is available from the Button Category of the Object List window. The Indicator Button object is an electronic version of a typical Indicator Button normally found on control panels. The Indicator Button is a combination of a Pushbutton and an Indicator Light. The Indicator Button can be used to activate or deactivate components assigned to a Discrete Tag Name.		The **Static Text** object is used to display a Frame with a personalized Message. This Frame and Message can be placed on any screen and any location within the screen.	
The **Indicator Light** object is an electronic version of a typical Indicator Light normally found on industrial control panels. The Indicator Light can be configured to display the status of the assigned Discrete Tag Name.		The **Lookup Text** object is used to display a Frame with a personalized Message. This Frame and Message can be placed on any screen and any location within the screen. The object is always displayed like a sign but is configured to display only the message prompted by an assigned Tag Name. Messages are retrieved from a Message Database which is configured by the user with text defined by the user. The Lookup Text Object will scroll text up to 128 characters.	
The **Graphic Indicator Light** object is a more enhanced version of the "Indicator Light Object" that allows the user to choose more detailed graphics to display the status of a tag. This object is an electronic version of a typical Indicator Light normally found on industrial control panels. The Indicator Light can be configured to display the status of the assigned Discrete Tag Name.		The **Dynamic Text** object is used to display text that is retrieved from data stored in a Tag. The Tag Name is assigned to registers in the PLC that contain set character data. The data can be stored in the PLC in ASCII format and may include information such as machine numbers, locations, part numbers, and such. The Message can be configured to be visible (Trigger) when an associated Tag Name is On or Off. This object can be placed on any screen and any location within the screen. The Dynamic Text Object will scroll text up to 40 characters.	
The **Numeric Display** consists of a frame that displays a real-time numeric value according to the value of data received from an assigned Tag Name. The Numeric Display supports numeric Signed Decimal, Unsigned Decimal, BCD, and Floating Point data types with up to 11 digits, including decimal point. User Defined Alpha Numeric Prefix and Suffix values are also supported.		The **Scroll Text** object is available from the Text Category of the Object List window. The Scroll Text object is an electronic version of a marquee. It is similar to the Static Text Object. If the text in the object does not fit in the window, it will scroll from right to left across the window. The Scroll Text object does not require a Tag Name assignment. The Scroll Text Object has a maximum character limit of 128 characters.	
The **Numeric Entry** object is used to enter a value from your Panel to a PLC Register. This object, when selected, opens a Numeric Keypad that allows the user to enter a new value that will be written to the assigned Tag Name. The Numeric Entry supports numeric Signed Decimal, Unsigned Decimal, BCD, and Floating Point data types with up to 11 digits, including decimal points. User Defined Alpha Numeric Prefix and Suffix values are also supported.		The **Screen Change** Pushbutton object is available from the Control Category of the Object List window. The Screen Change Pushbutton object is a pushbutton that can be configured to activate another screen in the project. This object may be edited to various colors and sizes. Users can configure the button to activate the Power-Up screen, Forward Screen, Previous Screen, or any one of the project screens.	
The **Increment/Decrement Value** object is used to add or subtract a value by pressing a button on the Panel. Basically the object uses two Tags, one to read a value from and another to write a modified value to. The Increment/Decrement Value supports numeric Signed Decimal, Unsigned Decimal, BCD, and Floating Point data types with up to 11 digits, including decimal points. The Increment and decrement values are also user selectable.		The **Screen Selector** object is available from the Control Category of the Object List window. This object is an enhanced version of the Screen Change pushbutton in that it offers many more features and defaults with data from screens in the project. This helps to save time by not having to create Screen change buttons for each screen. This object may be edited to various colors and sizes.	
The **Real Time Graph** object displays the value stored in up to two PLC tags, over a history of up to 24 points each. One point is added at each refresh.		The **Adjust Display Contrast** object is used to allow the operator to adjust the Panel Display Contrast. The default Display setting often works in most applications, however lighting may vary based on the location of each application. In these cases the operator can use this object to make adjustments. The current display setting value will appear on the top of the button and will change as the arrow keys are pressed. This button can be modified to various sizes.	
The **Line Graph** object displays the values of up to 24 PLC address points. Up to two address arrays can be displayed. The line is drawn in its entirety at each refresh.		The **Function** object is used to assign the panels function key buttons to a particular action as well as assigning the control of the LED On/Off status. When a button has been assigned as a shift button, the then F1 through F5 will become F6 through F10. The Function Object buttons will activate when the hardware button is pressed or when the object is pressed on the screen. The object size is restricted so that the keys will line up with the hardware function keys on the panel.	

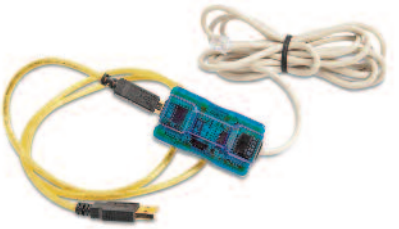
C-more Micro-Graphic Programming Connections

C-more STN Micro-Graphic Programming Connection

Using the *C-more* Micro-Graphic Programming Software for project development, STN *C-more* Micro-Graphic panels can be connected to a PC (personal computer) by using EA-MG-PGM-CBL, the USB-to-RS-232 cable assembly.

- Connect the USB programming cable (included) from a USB port type A on the PC to the USB type B port on the converter (included). Next connect the serial programming cable from the converter's RJ12 port to the panel's RJ12 serial port. The panel receives power from the USB port of the PC that it is connected to through the USB to RS-232 converter assembly.

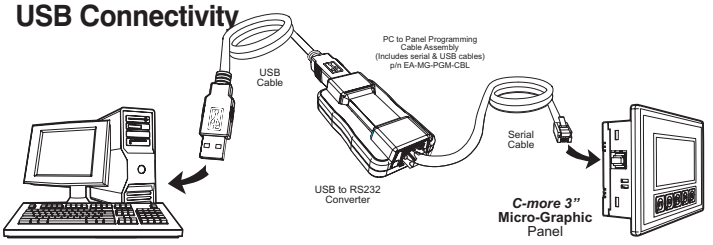
USB to RS-232 Programming Cable Assembly



Part No. EA-MG-PGM-CBL

<--->

USB Connectivity


PC to Panel Programming Cable Assembly (Includes serial & USB cables) p/n EA-MG-PGM-CBL
USB Cable
Serial Cable
USB to RS232 Converter
C-more 3" Micro-Graphic Panel

NOTE: The TFT panels EA1-T4CL and EA1-T6CL do NOT use the EA-MG-PGM-CBL assembly. The TFT panels use a standard USB A-to-B type cable such as USB-CBL-AB6. See below.

USB to RS-232 Converter Specifications	
Part Number	EA-MG-PGM-CBL
Hardware	
USB Interface	USB Specification Rev. 1.1 Connector: USB Type B jack to accept USB Type B cable plug
Serial Interface	RS-232 (EIA-232-E) Connector: RJ12 phone jack 6p to accept RJ12 cable plug
Baud Rate	115.2 kbps Maximum
Input Voltage	5 VDC (Supplied thru serial interface cable.)
Power Consumption	50 mA (Does not include power to panel and/or bezel.)
Accessory Cables (included)	
USB Cable	USB Type A plug to PC on one end, USB Type B plug to converter on other end, 0.30 m [1 foot] length (* Note)
Serial Cable	RJ12 phone plug connectors on both ends, 2.0 m [6.56 feet] length (* Note)
Physical	
Dimensions	2.559" (W) x 1.417" (H) x 0.886" (D) [65.0 mm x 36.0 mm x 22.5 mm]
Weight	1.06 oz. [30 g]
Environmental	See Micro-Graphic panel specifications at the beginning of this catalog section.
*** Note: Maximum cable length for either the USB or serial cable should not exceed 2.0 m [6.56 feet] in length.**	

C-more TFT Micro-Graphic Programming Connection

The *C-more* TFT Micro-Graphic panels EA1-T4CL and EA1-T6CL include an integral USB to serial converter. It is programmed via any USB Type A to Type B cable.

When properly installed on your PC, the device driver will be assigned a communication port number and appear in Windows Device Manager as a serial com port.

USB cable options for programming EA1-T4CL and EA1-T6CL

Part Number	Description	Price
USB-CBL-AB3	Standard 3-ft. (0.9 m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any *C-more* touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB6	Standard 6-ft. (1.8 m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any *C-more* touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB10	Standard 10-ft (3 meter) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any *C-more* touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB15	Standard 15-ft. (4.6 m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any *C-more* touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->